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# Literacy, Numeracy and Health and Wellbeing across Learning: Investigating Student Teachers' Confidence

*By Dr Louise Campbell, Dr Shirley Gray, Dr Tom McIntyre and Dr Kelly Stone*

## Abstract

The aim of the research reported here was to examine how confident student teachers, preparing for a career in secondary school teaching, felt to meet their responsibilities to teach skills across literacy, numeracy and health and wellbeing. By inquiring into their on-campus and placement learning experiences, we aimed to explore the extent to which they felt their initial teacher education programme had enabled them to teach across each area, as the Scottish curriculum and professional standards demand. A significant percentage of student teachers across all subject specialisms from our sample indicated a lack of confidence in providing numeracy experiences for their learners from within their subject area. Confidence for teaching literacy and health and wellbeing was much higher.

## 1. Introduction

It has been argued that curriculum policy reforms around the world in recent years have been united by a number of key goals, two of which interest us here. These are the drive for new curricula to have a more robust role in positively influencing teachers' practice than previous iterations, and for curricula to have clear relevance to millennial learners, to prepare them for the uncertainties of social, environmental, technological and economic change that lie ahead (Sinnema & Aitken, 2013). Implied in both goals is an expectation that teachers will embrace the need for a change to the status quo and that teachers will be equipped to enact such a major curricular reform in the spirit in which it is intended (Hayward & Hutchinson, 2013; Priestley & Humes, 2010). However, these expectations, along with concerns about teacher quality (Connell, 2009; Hatsor, 2012; Organisation for Economic Co-operation and Development, 2018) have resulted in challenging times for teacher education institutions, as well as for those studying to enter the teaching profession.

In Scotland, where the research outlined in this paper took place, a number of reviews of the teaching profession and teacher education, including those by McCormac (2011) and Donaldson (2011), have sought to create a climate of transformation and a will to embrace a new sense of purpose and deepening professionalism. These reviews link teaching in Scotland firmly with international perspectives relating to the needs of an increasingly diverse and connected society (Organisation for Economic Cooperation and Development, 2005). They also coincided with the implementation of A Curriculum for Excellence (CfE), Scotland's national curriculum, which was initially implemented in 2010, with new National Qualifications for secondary schools being introduced between 2013 and 2016 (Kidner, 2013).

One of the key changes associated with the new Scottish curriculum, and others internationally (see for example Gouvernement de Québec, 2019 and Welsh Government, 2018), lies in the assertion that core skills unite all aspects of learning and that these skills should be promoted across all areas of the curriculum (Priestley, 2013). This is in line with policy agendas that are envisioned as moving teachers' attention beyond content knowledge to embrace awareness about learners' competencies for lifelong learning (Sinnema & Aitken, 2013). These core skills are identified as literacy, numeracy and health and wellbeing (The Scottish Government, 2009) and are highlighted as being the responsibility of every educational practitioner at every level of education. Additionally, the General Teaching Council for Scotland, a governing body that maintains a register of teachers in Scotland and promotes professional learning of teachers, specifies in its Standard for Provisional

Registration, that student teachers should be able to 'plan appropriately for effective teaching and in order to meet the needs of all learners, including learning in literacy, numeracy, health and wellbeing and skills for learning, life and work' (The General Teaching Council for Scotland, 2012, p. 13). This expectation is carried over into the professional Standard for Full Registration also (The General Teaching Council for Scotland, 2012) and presents a particular challenge for aspiring secondary teachers (of learners aged 11-18 years) who normally enter the profession with one subject specialism or more.

### *1.1 Subject Specialism*

Teachers in Scotland beyond primary level are expected to demonstrate a higher and more focussed knowledge of an area of study to enable them to create and support learning opportunities in this subject area. Secondary teachers' professional identities, developed through their prior personal learning choices and the structure of professional graduate teacher education, are entwined with this specialism (Savage, 2012). It is also arguable that the institutional structure of secondary school departments is 'an expression of agency and shared identity' while also being something that has the capacity to 'shape agency and professional identity' (Lasky, 2005, p. 902). Secondary teachers' professional self-concept may, therefore, be seen as directly related to their specialised subject knowledge (Hobbs, 2012; Savage, 2012).

Sharing their subject knowledge is also a key component in subject specialist teachers' perceptions of what is enjoyable about the work of teaching (Kyriacou & Kunc, 2007), and this has an influence on what and how they teach (Hobbs, 2012). The very organisation of the curriculum into subject areas or modes with distinct curricular experiences and outcomes reinforces this perspective, where secondary school teachers in Scotland maintain 'principal allegiance to their specialist discipline rather than to any broader conception of learning process or the personal development of pupils' (Priestley & Humes, 2010, p. 347).

Understanding the links between pre-service teachers' self-concepts and their professional knowledge and development is an area which should be central to the aims of teacher education (Paulick, et al., 2016) (Yueng, et al., 2014). While research suggests that confident self-concept, for example as a subject expert, is a positive indicator of high levels of performance (Marsh & Martin, 2011), it is arguable that there may be a limiting factor associated with this, where narrow self-concepts in subject expertise may prevent teachers from exploring alternative ways of understanding and broadening their professional knowledge. This situation, where 'teachers' values, beliefs and the images they have of themselves and their subject may be challenged by complementary disciplines and what they bring to the cross-curricular experience' (McClune, et al., 2012, p. 67), is one that requires scrutiny. While it is not anticipated that subject specialism should be less demanding and expectations of teacher knowledge broadened (Noddings, 1998), it may be the case that there is a need for future teachers to be more flexible about the boundaries of their knowledge and their recognition of what is useful or valuable for a teacher to know.

### *1.2 The Role of Teacher Education*

It has been argued that student teachers require four lines of support from their teacher education for them to develop confidence in their professional abilities. These are i) help in developing subject-specific content knowledge relevant to their area of specialism and pedagogical principles for sharing this, ii) support for developing a repertoire of practical classroom skills to enable them to bring theory to their practice in effective ways, iii) support and guidance for preparing to be career-long reflective practitioners, and iv) help to create a disposition that values ongoing professional learning (Stahl, et al., 2016). The role of reflective practice in helping student teachers develop confidence and resilience has been explored in a number of studies (Akinbode, 2013; Johnson, et al., 2014; Thompson &

Pascal, 2012). The participation of student teachers in processes of reflection on their experiences during initial teacher education, both deliberate and subconscious, contributes not only to the development of their confidence in their professional knowledge but also to the development of their identities as future teachers. The thinking that goes on during this period arguably lays the foundations for student teachers' progress and job satisfaction once in service, as well as the likelihood of their ongoing retention in the profession (Schuck, et al., 2012). However, student teachers' confidence and self-efficacy is also significantly influenced by their practicum experiences (Boz & Boz, 2010; Caires, et al., 2012; Martins, et al., 2015; Woolfolk & Hoy, 1990), which is a particular focus of interest for us here. Valuable though research-based knowledge of the kind championed in teacher education institutions is, it is challenging for it to compete with the specific and directly applicable learning student teachers are exposed to in school placement settings (Burn, et al., 2007). This may be compounded by the influence of student teachers' personal experiences of education from the learner's perspective. Entry requirements for ITE programmes, regardless of subject specialism, include the need for an English qualification at SCQF Level 6 (Higher Grade or equivalent) and a Mathematics qualification at SCQF Level 5 (National 5 or equivalent), notably lower. This is something that may have a bearing on student teacher's numeracy skills, confidence and self-efficacy that we focus on in this paper.

### **1.3 Theoretical Framework and Research Aims**

The framework guiding this study engages with theories of Teacher Self-Efficacy (TSE) which advocate for teacher education as a vital stage in student teachers' apprenticeship (O'Neill & Stephenson, 2012; Pendergast, et al., 2011; Woolfolk & Hoy, 1990) and ongoing professional growth (Bray-Clark & Bates, 2003). Positive TSE is associated with feelings of confidence and competence and is recognised as a predictor of teachers' influence on learner outcomes, depth of engagement with their professional goals and resilience in the face of professional challenges (Tschannen-Moran, et al., 1998).

TSE, after Bandura (1997), posits four kinds of experiences that contribute to the development of self-efficacy in teaching practice. These are *mastery experiences* (associated with active participation in practice), *vicarious experiences* (associated with learning through observation), *social persuasion* (where more experienced or knowledgeable others influence thinking) and *physiological and affective states* (which provide physical stimulus for learning responses). In terms of the areas of inquiry informing the study, we were particularly interested in vicarious experiences, which we associated primarily with placement-based, observational learning, and social persuasion, which we associated with both on-campus learning and placement-based learning. These kinds of experiences are aligned with the learning experiences student teachers are most likely to have on the programme as learning planned by and involving others. While it was anticipated that some discussion of mastery experiences and physiological and affective states might arise during focus group discussions, these were not targeted via questionnaire items, since these were regarded as being largely beyond the scope of planned learning experiences. For these reasons, we did not utilise pre-existing self-efficacy questionnaires.

The main aim of this research was to examine student teachers' sense of self-efficacy to teach across literacy, numeracy and health and wellbeing as they engaged in their university and school-based learning experiences. In addition, by drawing from their recent placement experiences, we aimed to explore the extent to which they felt their programme had enabled them to teach across each area. In doing so, we hoped to uncover the factors that shape their preferences for teaching and understand how they might influence their willingness, perceived self-efficacy and therefore their confidence to engage with literacy, numeracy and health and wellbeing as part of their day to day teaching. The originality of this approach lies in the simultaneous investigation of confidence to engage with these three areas with a cohort of subject specialist secondary school student teachers learning about the practice of teaching within a process-based curriculum.

Our research questions were:

1. How confident do student secondary teachers feel to create learning experiences in literacy, numeracy and health and wellbeing from within their subject area?
2. What are these student teachers' dispositions in relation to this responsibility?
3. What are student teachers' perceptions about the opportunities they have had to learn about teaching literacy, numeracy and health and wellbeing through the on-campus and practicum aspects of their programme?

## **2. Methodology**

### *2.1 Setting and Participants*

The Scottish university where this research took place provides teacher education across a wide range of secondary school subject areas, drawing its students from a range of demographic and experiential backgrounds. On successful completion of a one-year Professional Graduate Diploma in Education (PGDE) Initial Teacher Education (ITE) programme, which is equally divided between the university setting and practical experience through placements in secondary schools, students embark on their induction year to secure full registration with the General Teaching Council for Scotland.

This research took place in the final months of students' PGDE programme, by which time they had been given opportunities for observation of, and involvement in, school practice, as well as considerable exposure to the academic setting. We hoped this would enable participants to take a perspective on their experiences across the full duration of their ITE programme and enable them to reflect on their preparedness and confidence for commencing employment as newly qualified teachers.

In academic year 2016-2017 when this study took place, there were a total of 156 students across 13 secondary school subjects studying on the PGDE programme. The research team had specialist knowledge and interest in the areas of literacy, numeracy and health and wellbeing. We aimed to understand the perspectives of as broad a range of students across as many secondary subject specialisms as possible, therefore we offered every member of this cohort the opportunity to participate in the first phase of our research. In total, 69 students agreed to complete the online questionnaire (see Table 1), of whom eight subsequently participated in our focus group interviews.

<b>Subject groups for purposes of analysis</b>	<b>PGDE Subject Specialism</b>	<b>Number of participants</b>
Creative (27)	Art and Design	5
	Drama	11
	Music	3
	Physical Education	8
Humanities (5)	Geography	2
	History	3
Languages (15)	English	10

	Modern Languages	5
STEM (22)	Biology	7
	Chemistry	4
	Design and Technology	6
	Mathematics	4
	Physics	1
<b>Total</b>		<b>69</b>

*Table 1: Participants' PGDE subject specialism groupings*

In terms of gender profile, females formed 65% of the questionnaire participants. This was broadly representative of the cohort, where 70% were female. The majority of participants identified as Scottish (77%), with smaller numbers coming from the rest of the United Kingdom (9%), Europe (7%), and/or categorising themselves with other national identities (7%).

Focus groups were comprised of a total of four female and four male participants from a range of subject areas. These participants were self-selecting, and therefore must be regarded as a convenience sample of the wider cohort which was the target population (Neumann, 2014). All focus group participants have been anonymised for purposes of reporting here, as indicated in Table 2.

<b>Focus Group Participant/Subject</b>	<b>Gender</b>
PE 1	Female
PE 2	Female
Geography	Male
Chemistry	Female
Physics	Male
Maths 1	Female
Maths 2	Male
English	Male

*Table 2: Participant Information*

## *2.2 Data Collection and Analysis Procedures*

In order to investigate the student teachers' sense of self-efficacy in connection with their responsibilities for literacy, numeracy and health and wellbeing, we gathered data in two phases. First, we administered a questionnaire to explore the perspectives of a number of students across a wide range of subject areas. Secondly, a sample of students from this cohort took part in a focus group interview. The purpose of the interviews was to explore the quantitative data from our questionnaire responses more deeply and investigate arising queries and trends more fully through qualitative analysis.

Questionnaire items were arrived at through an iterative process of discussion, beginning with statements from curriculum documentation relating to the responsibilities of all and the

detail of these curricular responsibilities. The language used to create questionnaire items was directly related to the language of the curriculum to ensure student teachers' familiarity with many of these ideas. The majority of questions were in rated response format, utilising a 7-point Likert scale (Finstadt, 2010) to indicate participants' level of agreement with key statements or the level of importance they accorded to the concepts under investigation. The questionnaire was piloted with six student teachers from a different cohort to test out its clarity and effectiveness, allowing for minor amendments, prior to the full launch online.

Quantitative analysis of questionnaire data was undertaken with the intention of identifying trends in student teachers' perceptions, in order to help inform future practice for meeting student teachers' learning needs. To this end, data were primarily analysed via descriptive statistics that identified distribution of responses. To enable analysis along disciplinary lines, where this was appropriate, we clustered the postgraduate secondary teaching subject areas into Creative, Humanities, Languages and STEM, as set out in Table 1.

For the analysis of responses from the 7-point Likert scale questions, all indications of agreement were drawn together, with neutral responses taken as not indicating a positive disposition and clustered alongside indications of disagreement.

In addition to single variable frequency analysis, cross tabulation helped us derive insights from contingent bivariate and multivariate data that could otherwise have been overlooked (Neumann, 2014). We used cross tabulation to understand the associations between variables (e.g. perceived levels of confidence with perceived opportunities for learning) and to identify how patterns changed from one variable grouping to another.

Focus group discussions were organised around three broad areas of exploration linked to our research questions, namely, 1) confidence, 2) dispositions and 3) opportunities to learn. We asked focus group participants to explain their levels of confidence in literacy, numeracy and health and wellbeing, their perceptions about the significance of these areas, and to share their experiences of learning about these areas during their ITE programme, both in the university context and on their school placements. We also shared key findings from the questionnaire data with focus groups, particularly in relation to reported confidence levels across the participant group, to solicit their thinking about possible reasons underlying these findings.

Focus group discussions were audio-recorded and transcribed in full by the researchers. Thereafter, each of the four researchers undertook simultaneous parallel primary-cycle inductive coding of the transcripts, interspersed with meetings to share and discuss our emerging analyses (Tracy, 2013). We synthesised a range of categories from these discussions, then returned to individual coding, this time more selective, for further refinement of interpretation and analysis. From this, we collated the range of findings and compared them once more to enable as consistent a shared understanding of the focus group data as possible.

### *2.3 Ethics*

All student teachers on the secondary PGDE programme were encouraged to participate as part of their professional development but it was made clear that participation was optional. They were advised their responses would remain anonymous, except to the research team, and that their responses would have no negative impact on their studies, as individual responses would not be shared beyond the research team. Although participants' names were taken as part of the questionnaire data, these were not used except as a means of ensuring no participant undertook the questionnaire more than once. Quantitative analysis was undertaken on the basis of response identification number and teaching subject area and at no point were names used as identifiers during the data analysis process. Focus group participants were assured that audio-recordings would be deleted on completion of the research and that they would be anonymised in any sharing or publication of findings.

### 3. Results and Analysis

#### 3.1 Student teachers' confidence to provide experiences for learners in literacy, numeracy and health and wellbeing

As Table 3 suggests, the student teachers who participated in our research were considerably more confident in providing literacy and health and wellbeing experiences for learners than in providing numeracy experiences, where nearly 50% of respondents indicated a lack of confidence.

<b><i>I feel confident in my ability to provide experiences for learners in ...</i></b>	<b>Literacy Frequency (%)</b>	<b>Numeracy Frequency (%)</b>	<b>Health and Wellbeing Frequency (%)</b>
Strongly Disagree/Neutral	11 (15.9)	34 (49.3)	8 (11.6)
Agree/Strongly Agree	58 (84.1)	35 (50.7)	61 (88.4)

*Table 3: Confidence to provide experiences for learners in literacy, numeracy and health and wellbeing (n=69)*

When broken down into subject areas (Table 4), it becomes clear that the anticipated dichotomies traditionally associated with subject specialisms are not as clearly demarcated in our sample as had been hypothesised. Although student teachers preparing to teach in the fields of science, technologies and mathematics were the most confident of our participants in providing numeracy experiences for learners, one fifth of that sub-group expressed a lack of confidence for this.

<b>Discipline</b>	<b>Total</b>	<b>Literacy CONFIDENT (%)</b>	<b>Numeracy CONFIDENT (%)</b>	<b>HWB CONFIDENT (%)</b>
Creative	27	21 (77.8)	8 (29.6)	25 (92.6)
Humanities	5	5 (100.0)	3 (60.0)	4 (80.0)
Languages	15	14 (93.3)	6 (40.0)	15 (100.0)
STEM	22	18 (81.8)	18 (81.8)	17 (77.3)
Total	69	58 (84.1)	35 (50.7)	61 (88.4)

*Table 4: Confidence to provide appropriate experiences for learners by subject type*

Of the students from this sub-group who participated in our focus groups, there was no



expression of lack of confidence. However, based on their personal observations and peer discussions during the course of their ITE programme, these participants were prepared to suggest why they believed others could feel challenged by providing numeracy experiences for learners. One saw some of their peers as suffering from ‘mental closure’ because ‘some may not have done maths for many years’ (Chemistry). Another suggested that a part of the issue may be an implicit barrier where ‘there’s maybe a gap where [student teachers] have not been confident with it themselves at school.’ (Maths 1)

In contrast to this, one focus group participant from outside the science, technology and mathematics sub-group, but who had studied mathematical concepts to degree level, told us;

‘...my own degree background was in geography and economics and in economics there is some horrendous maths around calculus and things like that, so whenever I hear maths or numeracy, I would assess myself against that standard rather than your day to day numeracy.’ (Geography)

This suggests that students’ perceptions of expectations for teaching numeracy across learning may diverge significantly from curricular expectations creating a challenge to their sense of self-efficacy. This suggests a lack of vicarious learning experiences or social persuasion to guide perception in this area.

### *3.2 Student teachers’ views on the requirement for all practitioners to teach literacy, numeracy and health and wellbeing*

As a further means of exploring participants’ attitudes and dispositions in the questionnaire, we asked student teachers to indicate whether they believed the requirement to develop literacy, numeracy and health and wellbeing made a valuable contribution to children’s learning and whether they believed this requirement was realistic and practical. Results are presented in Table 5.

Over four fifths of questionnaire participants agreed that the requirement for all teachers to provide literacy, numeracy and health and wellbeing experiences for learners made a valuable contribution to children’s learning but over one third regarded this goal as unrealistic or impractical.

Literacy, numeracy and health and wellbeing across learning makes a <b>valuable contribution</b> to children’s learning.		This requirement is <b>realistic and practical</b> .	
Disagree/Neutral (%)	Agree/Strongly Agree (%)	Disagree/Neutral (%)	Agree/Strongly Agree (%)
12 (17.3)	57 (82.6)	25 (36.2)	44 (63.8)

*Table 5: Views on requirement for all practitioners to teach skills across learning (n=69)*

Focus group participants were highly appreciative of the value of providing these learning experiences for children, characterising them as: ‘lifelong skills’ (PE 2), ‘really essential for life’ (Physics) and ‘of paramount importance’ (Chemistry). Some described this range of skills as the most useful product of secondary education:

‘You want to make sure they are walking away with something.’ (PE 1)

‘...our job is to ensure that the kids that come into the classroom and our care can leave school with all of the basic requirements of skills that they need. And I think that should be everyone’s responsibility...’ (Maths 1).

One participant agreed the importance of these skills but acknowledged ‘...it is a standard we would have to work to reach...’ (Geography)

When the questionnaire data for student teachers’ views was cross tabulated with participants’ perceived confidence in providing associated experiences (Table 6), it became clear that, as before, literacy and health and wellbeing were regarded more positively than numeracy.

Over 90% of those who agreed that these experiences are valuable to learners, and realistic and practical for practitioners to implement, expressed confidence in providing experiences for learners in relation to literacy and health and wellbeing. A significantly smaller proportion of those who expressed confidence in providing numeracy experiences thought these experiences were valuable to learners (54%) and realistic for practitioners to implement (59%).

Confidence to provide ...	The requirement for all teachers to provide literacy, numeracy and health and wellbeing experiences across learning makes a <b>valuable contribution</b> to children’s learning.	This requirement is <b>realistic and practical</b> .
	Agree/Strongly Agree (%)	Agree/Strongly Agree (%)
... <b>Literacy</b> experiences n=58 (84.1%)	52 (91.4)	41 (93.2)
... <b>Numeracy</b> experiences n=35 (50.7%)	31 (54.4)	26 (59.1)
... <b>Health and Wellbeing</b> experiences n=61 (88.4%)	52 (91.2)	42 (95.5)

*Table 6: Views on the requirement for all teachers to provide literacy, numeracy and health and wellbeing experiences across learning by respondents’ confidence to provide learning experiences*

Focus group participants expressed a generally positive attitude to literacy, with a number of comments centring around the importance of vocabulary, spelling accuracy and grammar (Geography, Chemistry, Maths 1 and Maths 2).

Focus group comments about numeracy were more equivocal. One participant said:

'I don't know what the standard is. Getting it involved in lessons, that's our responsibility, but I'm not sure what we are aiming for.' (PE 2)

'I would feel that if you were making a graph or doing a calculation it's quite important that it's consistent across all the subject areas. And I guess it feels...there could be a wrong way to teach it.' (Geography)

In these instances, participants see the need for numeracy as a skill but appear, again, to have lacked vicarious experiences to allow them to develop self-efficacy through observation. It is implied that there is an awareness of the requirement, perhaps as a result of social persuasion within the on-campus aspect of their learning, but that the practical application needs further support.

For one participant, mathematical ability was identified as being separate from the ability to teach numeracy skills, recognising that once you understand an aspect of mathematics (or numeracy) it becomes 'obvious' and therefore challenging to unpack for teaching purposes:

'Maths for me is like cycling. Once you have learned it, it is hard to forget about it. It becomes so easy and natural that you forget about how you do it.' (Physics)

This view reinforces the importance of teacher modelling as a crucial aspect of the vicarious experiences required to help develop student teachers' self-efficacy in this area.

Focus group participants provided us with a mixed picture of their confidence for providing health and wellbeing experiences. Student teachers PE 1 and 2 saw health and wellbeing as core learning associated with their subject area and undergraduate degree and therefore felt confident with that aspect of teaching, but less confident with literacy and numeracy that were perceived to be outside their domain of expertise:

'It's a real passion of mine, ... to improve the health and wellbeing of the community... it's not just PE in schools...' (PE 1)

'Things like fitness, when they ask about heart rates, because we've had all that experience, we can give them the answers and increase their knowledge, whereas literacy and numeracy, we don't have that background...' (PE 2)

One participant told us:

'...of the three areas, I'm most unclear about what embedding health and wellbeing into my teaching itself looks like.' (Geography)

Others saw health and wellbeing as a foundational context from which all other learning should grow and therefore of greatest importance, and yet this was identified by our focus group participants as an area where there is insufficient input for student teachers:

'...health and wellbeing I feel the least confident with, and [it] is somehow, I feel, the most important because if a person is not happy, or healthy, if they are not happy at school, they will not work well and their literacy and numeracy will be impacted.' (Physics)

'I think we should really spend a good couple of weeks in the support department... to witness a range of difficulties and how to deal with them. We are told about the issues but not how to deal with them.' (Chemistry)

'I was a bit shocked... to find out how much responsibility we've got. We're actually *in loco parentis*. I'd never really appreciated that before.' (English)

As the above excerpts from these discussions imply, there was some slippage between our focus group participants' perceptions of health and wellbeing as an aspect of the curriculum intended to develop learners' skills and the idea of health and wellbeing connected with teachers' pastoral responsibilities. Additionally, while it is suggested that there is coverage of relevant ideas in on-campus learning (social persuasion), the modelling of operationalisation of this knowledge through vicarious experience in the school-based portion of the ITE year is not always forthcoming.

### *3.3 Student teachers' perceptions of opportunities to learn about literacy, numeracy and health and wellbeing during their Initial Teacher Education programme*

Participants were asked to rate their perceptions of opportunities for learning about literacy, numeracy and health and wellbeing in the university setting and the school placement setting, in order to allow us to explore associations that might exist between learning opportunities and feelings of confidence. Table 7 shows that perceptions of opportunities for learning about each of the three areas are relatively evenly distributed, with slightly more positive perceptions in relation to literacy across both university and school placement settings. Only around 50% of participants regarded themselves as having had opportunities to learn about the development of numeracy skills in their university-based component, with fewer respondents acknowledging opportunities in the school placement-based component of their ITE programme. Higher proportions reported opportunities for developing their knowledge in the areas of health and wellbeing and literacy in their school-based component, with comparable levels of opportunity in their university-based learning.

<b>Opportunities to learn about teaching skills for ...</b>	<b>... in my university-based learning</b> Frequency (%) n=69	<b>... in my school-based learning</b> Frequency (%) n=69
<b>Literacy</b> Agree/ Strongly agree	44 (63.8)	44 (63.8)
<b>Numeracy</b> Agree/ Strongly agree	36 (52.2)	32 (46.4)
<b>Health and Wellbeing</b> Agree/ Strongly agree	37 (53.6)	41 (59.4)

*Table 7: Summary of respondents' perceived opportunities to learn about literacy, numeracy and health and wellbeing*

Some of our focus group participants were able to be specific about where they felt they had been given opportunities to learn through the on-campus aspects of the programme and where they felt there were gaps:

'We had a couple of lectures on literacy and numeracy.' (PE 2)

'...there is a large emphasis on literacy, then numeracy. I don't recall having had any explicit discussions about health and wellbeing.' (Geography)

Additionally, one participant recalled a specific on-campus teaching episode where numeracy skills were at the centre of learning and a source of challenge for some of those involved:

'I remember we did an activity and people had forgotten how to order numbers. [...] I think for some of the students in the room, they were like 'Oh my God. I should know how to do this.' (Maths 1)

Tables 8 and 9 cross tabulate participants' responses about opportunities for learning in university-based and school-based settings with their stated level of confidence in providing opportunities in each of the three areas for learners.

High proportions of respondents who were confident in providing learning experiences for learners in literacy, numeracy and health and wellbeing recognised their ITE programme included opportunities to learn about teaching skills for literacy and numeracy in both university and school-based components, with slightly lower proportions acknowledging opportunities to develop teaching skills for health and wellbeing (Table 8).

Agree/Strongly agree on opportunities to learn about teaching skills for ...		... in my university-based learning	... in my school-based learning
Literacy	n=58 (%)	43 (97.7)	41 (70.7)
Numeracy	n=35 (%)	27 (77.1)	26 (74.3)
Health and Wellbeing	n=61 (%)	37 (60.7)	40 (65.6)

*Table 8: Perceived opportunities to learn about skills across learning in ITE where respondents were **confident** in providing experiences for learners*

The majority of those who indicated a lack of confidence in providing appropriate experiences for learners did not perceive there were opportunities to learn about teaching skills in their ITE programme (Table 9). This suggests there is a correlation between lack of self-efficacy and lack of perception of vicarious or socially persuasive experiences.

Disagree/Neutral on opportunities to learn about teaching skills for ...		... in my university-based learning	... in my school-based learning
Literacy	n=11 (%)	10 (90.9)	8 (72.7)
Numeracy	n=34 (%)	25 (73.5)	28 (82.4)
Health and Wellbeing	n= 8 (%)	8 (100.0)	7 (87.5)

*Table 9: Perceived opportunities to learn about skills across learning in ITE where respondents were **not confident** in providing experiences for learners*

It was notable that very few participants said they were not confident in providing health and wellbeing experiences for learners. Additionally, a high proportion of participants said they were confident to provide health and wellbeing experiences for learners even where they disagreed there had been opportunities to learn about this through their ITE programme.

## 4. Discussion

### 4.1 Literacy

In relation to literacy, our data support the Scottish Survey of Literacy and Numeracy (SSLN) finding, which describes broad confidence in teaching literacy experiences and outcomes in practising teachers nationally (The Scottish Government, 2017). The SSLN, a national sample survey that included a teacher questionnaire to collect information on teachers' experiences of delivering literacy and numeracy across learning, reported that the majority of teachers were generally confident in teaching literacy experiences and outcomes. The findings revealed that primary teachers were more confident teaching literacy across learning than secondary teachers and, among secondary school teachers, those teaching subjects other than English were generally less confident. However, our survey showed 84% of all our secondary student teacher participants expressed confidence in teaching literacy, with the lowest frequency of confidence being indicated by creative subject specialisms (78%) and the highest frequency indicated by those studying to teach humanities subjects (100%). The latter is notably higher than those studying to teach languages (see Table 2), which includes those preparing to teach English (93%). Of those preparing to teach STEM subjects, 82% said they were confident to provide learning experiences in literacy. These data make it problematic to draw any inferences about the relationship between undergraduate degree-related subject specialism and student teachers' confidence to help learners develop literacy skills, since there is no obvious association between subject area and confidence, and margins of difference across subject areas are small.

One possible rationale for this finding may be related to the implicit nature of the literacy skills required for academic success in the majority of areas of undergraduate study. As subject specialists, it has been argued that secondary school teachers are already equipped with a high level of literacy within their own areas of specialism, which they must be able to share with pupils to allow them to successfully access the linguistic requirements of those subjects (Fenwick, 2010).

Our survey analysis indicates that participant student teachers recognise, in large part, the opportunities for vicarious and socially persuasive learning they have had in relation to literacy both on campus and on practicum, and our data seem to suggest that there is an association between this learning experience and positive indications of confidence. However, it may be a limitation of this study that this association was not consistently verifiable through our focus group participants' comments. There were a variety of responses to questioning about what literacy teaching would mean within their subject context, some of which indicated very narrow conceptions of literacy across learning (for instance, a focus on vocabulary) and several suggested a lack of clarity about the relationship of literacy skills to their teaching subject.

### 4.2 Numeracy

A high percentage of student teachers across all subject specialisms from our sample indicated a lack of confidence in providing numeracy experiences for their learners within their subject area (49%). This provides an intriguing contrast with SSLN data, which reports that over 95% of secondary Mathematics teachers participating in that survey expressed confidence in teaching numeracy, with secondary non-Mathematics teachers reporting relatively lower levels of confidence, ranging from 64% to 94% for different aspects of numeracy (The Scottish Government, 2016).

It is possible that the relatively low confidence indicated by our participants may relate to the cognitive and affective anxieties associated with mathematical processes and performance (Dowker, et al., 2016). Tariq and Durrani (2012) identified positive associations between confidence in numeracy and high pre-university mathematics qualifications, where respondents possessed a more cohesive conception of mathematical ideas and generally displayed a positive attitude to numeracy. Where prior mathematical learning was lower, such as is the case for many candidates seeking entrance to Scottish ITE, they identified this as a negative predictor for students' perceptions of their numerical competence. The combination of anxieties over mathematics and numeracy and what can be regarded as low entrance requirements in mathematics, creates a worrying picture for future secondary school teachers' confidence and preparedness to teach numeracy skills across learning.

It was also notable that of student teachers specialising in STEM subjects, nearly a fifth indicated a lack of confidence for providing numeracy experiences for learners. This was contrary to the research team's expectations, as we had anticipated that teaching of STEM subjects would attract student teachers with a higher level of self-efficacy with numerical concepts, as a result of the nature of the prior learning associated with these subjects. The question these data raise relates to why assumed competency with mathematics does not necessarily translate into confidence to provide numeracy experiences for learners. As our Geography focus group participant suggests, it may be that there is a lack of clarity for student teachers around what numeracy across the secondary curriculum means in secondary school practice and how different the curricular expectation of this is from STEM graduates' perceptions.

The relationship between perceptions of opportunities to learn about numeracy across the curriculum and student teachers' confidence in relation to this presents us with a further challenge. Our participants, who were offered the same university-based core learning opportunities regardless of subject specialism, appear to have had varied perceptions of their opportunities to learn about numeracy on campus. This may indicate a need for greater consideration of how learning is contextualised for student teachers in future cohorts. Less surprisingly, student teachers' experiences in schools have resulted in a range of perceptions of opportunities to learn about numeracy across the curriculum. This may indicate a range of practice in schools in relation to numeracy. It may also be indicative of student teachers' divergent levels of awareness of implicit aspects of the teaching and learning they have observed through their vicarious experiences on practicum.

#### *4.3 Health and Wellbeing*

It was notable that confidence to provide health and wellbeing experiences for learners was fairly uniformly reported from both those who did and those who did not see themselves as having had opportunities to learn about health and wellbeing during their ITE programme. This invites further inquiry about the precise nature and possible sources of this confidence, given its apparent dislocation from the various kinds of teaching and learning experiences offered by the programme.

The assumption that life experience is a form of preparation for developing learners' skills in this area may go some way to explaining the very high frequency of confidence indicated by our survey participants. This may also intersect with views regarding the opacity of this aspect of the curriculum. In exploring how teachers understand the concept of health and wellbeing in the context of their own work, it has been highlighted that there is a lack of clarity around the terms 'health' and 'wellbeing', and especially the latter (Spratt, 2016). While this vagueness enables a more malleable use of the term 'health and wellbeing' in various contexts, it can lead to confusion and disagreement about what it means in practice for teachers. The way in which a student teacher understands the concept is likely to have an influence on their practice. However, their confidence to teach and nurture pupils' health and wellbeing will also be influenced by their knowledge, awareness, and skills around the

specific learning areas associated with this (Dewhurst, et al., 2014), as indicated by the focus group participants who were Physical Education students. These participants told us the root of their confidence in this area came from their undergraduate degree knowledge, particularly in relation to physical health.

Our focus group data suggest that the relationship between knowledge, confidence and effective practice is an area of particular interest. This intersection may be less than transparent, since concerns about the responsibility associated with teachers' pastoral role were expressed by a number of focus group participants, despite very high levels of confidence for providing learning experiences in this area being reported in the questionnaire data. Those who had linked their *pastoral* responsibilities to the requirement to provide health and wellbeing learning experiences appeared not to be fully aware of the expectations of this aspect of their *curricular* responsibilities. This slippage highlights the importance of student teachers having a thorough understanding of the curricular expectations associated with health and wellbeing, and how their responsibilities in this area might influence their practice in the teaching of their subject.

#### *4.4 Values and Dispositions*

While the data discussed above present us with a number of challenges for the enhancement of teacher education, we find one aspect of the findings reassuring. Four fifths of questionnaire participants agreed that the requirement for all teachers to provide literacy, numeracy and health and wellbeing experiences for learners makes a valuable contribution to children's learning. This suggests that, while there may be some barriers to overcome in terms of preparing student teachers for meeting this requirement, many of them recognise its value and should, therefore, be positively disposed to engage with professional development opportunities to enable them to further develop their self-efficacy in this area once in service.

Within schools, structured programmes of professional development can offer opportunities for ongoing occupational socialisation (Elliot, et al., 2013), as can collegiate interactions and communities of practice. The social nature of these interactions unavoidably entails peer influence and consequent learning (Wenger, et al., 2002) - the social persuasion dimension theorised by Bandura (1997). While the nature of these in-school processes may reflect management priorities at a school or local authority level, they also offer the potential for fostering a powerful culture of teacher growth (Kennedy, 2011). There is, in addition, a perception that organised, instrumental frameworks for professional learning may offer a means of combating the 'notoriously conservative' (Reeves & Drew, 2013, p. 40) tendencies of educational systems. A positive and open community of teacher learning within schools can therefore offer opportunities for student teachers and those who are newly qualified to articulate and share their pre-service learning and values, thereby impacting, in some measure, on the occupational socialisation and professional growth of longer serving colleagues, for mutual benefit.

High quality teacher education can therefore lead not only to these students becoming more effective practitioners in terms of enacting curricular reform but also to them exerting positive influence on their longer serving peers, in schools where a genuinely aspirational and open approach to professional learning guides practice (Flores & Day, 2006). Viewed from this perspective, the onus lies with teacher educators to ensure programmes of study can genuinely and deeply facilitate the knowledge, skills and dispositions, and impact the pedagogical beliefs that enable professional transitions of the kind anticipated through curriculum reform. The question of how best to bring this about is one that requires focussed attention.

## **5. Conclusion**



A number of issues have been brought to light by this research. In terms of trends within this participant group, negative perceptions of self-efficacy and related low confidence in connection with numeracy are significant and all the more noteworthy for being measured alongside perceptions of literacy and health and wellbeing. While one of the limitations of this study might have concerned the legitimacy of student teachers' claims of confidence nearing the endpoint of their ITE programme when their preparedness for practice was under scrutiny, the low confidence expressed in numeracy suggests that this was not a significant issue. Further studies to explore whether this trend is mirrored in other teacher education institutions, both within the Scottish context and beyond, where process-based curricula requiring enhanced teacher professionalism are in place, would provide more comprehensive data on this, though additional attention needs to be paid to challenging the resistance to numeracy that appears to be rooted in the perceptions of a significant proportion of student teachers.

The generally positive responses linked to literacy and health and wellbeing require further scrutiny also, in order to explore what student teachers' thoughts are about how this confidence translates into practice. Follow-up interviews with our participants to explore the impact of practice on perceptions could provide useful insights into if/how these participants' ideas about responsibilities across learning have altered with experience over time.

The apparent disharmony between questionnaire findings and the perspectives of focus group participants in some areas of this research suggest there may be a need for greater clarity around what is meant by responsibilities across learning, particularly in relation to numeracy and health and wellbeing, where inconsistencies were most marked. This is an area where teacher education can and must provide more effective support through ITE programmes.

In terms of considering how this research can inform thinking about areas for improvement in ITE, one area that would benefit from greater attention is the relationship between on-campus learning and school-based placements. While a benefit of practicum learning is the variety of experiences and perspectives this can offer, it is clear that student teachers' appreciation of the quality and value of their learning in these settings varies. Better communication with both students and practicum mentors could encourage a clearer awareness of what learning is required and how it can be supported effectively.

Another aspect for ITE institutions to consider in the light of findings here is the explicitness with which skills across learning are approached in campus-based teaching. While these skills may be regularly implied in academic inputs, this research suggests that there is a need for these skills to be foregrounded more frequently, in order to build greater student understanding of the relationship of these skills to their specialist subject knowledge and teaching practice.

The generalisability of these findings lies in awareness of the intimate relationship between curriculum interpretation and practice. In contexts where process-based curricula ask teachers to take responsibility for the development of learners' skills beyond subject specialisms, research here suggests the need for detail and clarity in the planning and development of frameworks and curricula for Initial Teacher Education to support student teachers with interpreting and enacting their responsibilities in practice. Additionally, it highlights the importance of meaningful and effective vicarious and socially persuasive learning experiences to develop confidence.

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